



# ICAO ENGINE nvPM EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: PW1127GA-JM BYPASS RATIO (-): 12.3  
 UNIQUE ID NUMBER: 01P22PW162 PRESSURE RATIO  $\pi_{co}$  (-): 31.7  
 COMBUSTOR: TALON X, Block-D  
 ENGINE TYPE: TF RATED OUTPUT  $F_{co}$  (kN): 120.4

### REGULATORY DATA

| CHARACTERISTIC VALUES:                     | $LTO_{mass}/F_{co}$<br>(mg/kN) | $LTO_{num}/F_{co}$<br>(particles/kN) | NVPM MASS CONCENTRATION<br>( $\mu\text{g}/\text{m}^3$ ) |
|--------------------------------------------|--------------------------------|--------------------------------------|---------------------------------------------------------|
| LTO/ $F_{co}$ AND MAX nvPM <sub>mass</sub> | 37.3                           | 1.18E+15                             | 1065                                                    |
| AS % OF CAEP/10 LIMIT                      | -                              | -                                    | 17.7                                                    |
| AS % OF CAEP/11 LIMIT (InP)                | 1.8                            | 9.0                                  |                                                         |
| AS % OF CAEP/11 LIMIT (NT)                 | 8.9                            | 22.8                                 |                                                         |

### MEASURED DATA

| MODE                                                                                | POWER SETTING<br>(% $F_{co}$ ) | TIME<br>minutes | FUEL FLOW<br>kg/s | EMISSIONS INDICES*            |                                     | NVPM MASS CONCENTRATION<br>PEAK nvPM <sub>mass</sub><br>( $\mu\text{g}/\text{m}^3$ ) |
|-------------------------------------------------------------------------------------|--------------------------------|-----------------|-------------------|-------------------------------|-------------------------------------|--------------------------------------------------------------------------------------|
|                                                                                     |                                |                 |                   | EI <sub>mass</sub><br>(mg/kg) | EI <sub>num</sub><br>(particles/kg) |                                                                                      |
| TAKE-OFF                                                                            | 100                            | 0.7             | 0.800             | 29.2                          | 4.10E+14                            |                                                                                      |
| CLIMB OUT                                                                           | 85                             | 2.2             | 0.670             | 20.4                          | 3.89E+14                            |                                                                                      |
| APPROACH                                                                            | 30                             | 4.0             | 0.232             | 0.2                           | 3.10E+13                            |                                                                                      |
| IDLE                                                                                | 7                              | 26.0            | 0.080             | 3.5                           | 4.18E+14                            |                                                                                      |
| LTO TOTAL (kg, mg, number of particles)                                             |                                |                 | 303               | 3233                          | 1.02E+17                            | -                                                                                    |
| NUMBER OF ENGINES                                                                   |                                |                 |                   | 1                             | 1                                   | 1                                                                                    |
| NUMBER OF TESTS                                                                     |                                |                 |                   | 4                             | 4                                   | 4                                                                                    |
| AVERAGE LTO/ $F_{co}$ VALUES (mg/kN, particles/kN)                                  |                                |                 |                   | 26.8                          | 8.48E+14                            | -                                                                                    |
| MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ( $\mu\text{g}/\text{m}^3$ ) |                                |                 |                   | 29.2                          | 4.19E+14                            | 827                                                                                  |

\* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

### DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

| MODE      | POWER SETTING<br>(% $F_{co}$ ) | CORRECTED EMISSIONS INDICES      |                                        |
|-----------|--------------------------------|----------------------------------|----------------------------------------|
|           |                                | EI <sub>mass_SL</sub><br>(mg/kg) | EI <sub>num_SL</sub><br>(particles/kg) |
| TAKE-OFF  | 100                            | 36.3                             | 1.45E+15                               |
| CLIMB OUT | 85                             | 26.3                             | 1.60E+15                               |
| APPROACH  | 30                             | 0.6                              | 3.85E+14                               |
| IDLE      | 7                              | 7.8                              | 5.78E+15                               |

### AMBIENT CONDITIONS

|                                | From   | To     | FUEL                          |       |
|--------------------------------|--------|--------|-------------------------------|-------|
| BAROMETER (kPa)                | 101.5  | 102.2  | HEAT OF COMBUSTION (MJ/kg)    | 43.32 |
| TEMPERATURE (K)                | 279.6  | 300.8  | HYDROGEN CONTENT (%mass)      | 13.89 |
| HUMIDITY (kg water/kg dry air) | 0.0036 | 0.0120 | AROMATICS CONTENT (%vol)      | 16.5  |
|                                |        |        | NAPHTHALENE CONTENT(%vol)     | 0.74  |
|                                |        |        | SULPHUR CONTENT (ppm by mass) | 228   |

MANUFACTURER: Pratt & Whitney  
 TEST ORGANIZATION: Pratt & Whitney  
 TEST LOCATION: W. Palm Beach, FL  
 TEST DATES: 18/01/2020-21/01/2020

### REMARKS

1. Data from certification report PWA-12090
2. 1 engine tested
3. TALON-X, Block-D combustor
4. Certification in accordance with ICAO Annex 16 Vol. II., Part III, Chapter 4.